NASA TECH BRIEF

Dry Film Lubricant Is Effective at Extreme Loads

The problem:

To develop a lubricant that will protect low speed sliding surfaces under extreme loading.

The solution:

A dry film lubricant in an inorganic binder applied to substrates with sufficient hardness to prevent surface deformation in the applicable load range.

How it's done:

The inorganically bonded lubricant is composed of the following:

Component	Parts by Weight
Molybdenum disulfide	10
Graphite	1
Bismuth powder	14
Aluminum phosphate binder	9

The addition of the small amount of graphite (2.94 percent of the weight) to the molybdenum disulfide film appears to increase film load carrying capability to its ultimate point. The substrate is hardened to a value of Rockwell C42-55 to prevent deformation that would tend to disrupt the lubricant film. The surface is first prepared to receive the lubricant, the film is sprayed on to a depth of 0.0005 to 0.001 inch and baked at approximately 300° F for 5 hours.

Notes:

1. Tests proved this lubricant superior at high loads (over 100,000 psi) to fluid lubricants, unbonded and resin bonded dry lubricants, and to other inorganically bonded dry lubricants.
2. Further information concerning this innovation is presented in NASA Technical Memorandum NASA TMX-53331, "Investigation of the Coefficient of Friction of Various Greases and Dry Film Lubricants at Ultra High Loads for the Saturn Hold Down Arms" by K. E. Demorest and A. F. Whitaker. Inquiries may also be directed to:
   Technology Utilization Officer
   Marshall Space Flight Center
   Huntsville, Alabama 35812
   Reference: B66-10256

Patent status:

Inquiries about obtaining rights for the commercial use of this invention may be made to NASA, Code GP, Washington, D.C. 20546.

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Category 03